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*"To the solid ground
Of Nature trusts the mind which builds for aye."*—WORDSWORTH.

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ARISTOTLE AS BIOLOGIST.

The Works of Aristotle, Translated into English.
De Generatione Animalium. By Prof. A. Platt. Price 7s. 6d. net. De Partibus Animalium. By Dr. W. Ogle. Price 5s. net. Vol. iv., Historia Animalium. By Prof. D'Arcy W. Thompson. Price 10s. 6d. net. (Oxford: Clarendon Press, 1910-11.)

THE biological treatises of Aristotle are one of the chief marvels of antiquity. Remarkable in themselves for the evidence they give of the extraordinary powers of observation and reasoning possessed by their industrious author, they become truly astonishing when considered as only a comparatively small part of the life-work of a philosopher who entered profoundly into every department of human knowledge. The view has sometimes been entertained that after all Aristotle in his physical treatises was a mere copyist, that these works are rather of the nature of a literary compilation from sources now mainly lost than a record of original research and observation. A moderately careful study of, say, the "History of Animals" is sufficient to show that this is an error. Aristotle had undoubtedly made himself acquainted with what we should now call the "literature of the subject," and when it seems necessary he quotes from earlier writers. But it is not his way to borrow their statements uncritically. If Herodotus or Ctesias makes what he considers to be a mistake, he does not hesitate to say so. Moreover, the "History" teems with what are beyond all reasonable doubt good first-hand observations derived from actual dissection.

That errors should be numerous is only what might be expected considering the necessary limitations to research in the fourth century B.C. But it must be allowed that in his zoological and physiological speculations Aristotle displays reasoning powers of the highest order, and indeed it is often difficult to see that with the only data open to him he could have come to any sounder conclusions. It is curious that in the case of the strange phenomenon of hectocotylisation in the dibranchiate cephalopoda the Greek fisher-

men were right and Aristotle was wrong. But even here, as Prof. Platt remarks, he seems justified on the evidence before him. He could see no connection of the hectocotylised arm with the vasa deferentia, and "it is no wonder that he thought this decisive against the theory of the fishermen. He only deserves credit for doing so."

But in spite of this and many other errors perhaps equally excusable, it is undeniable that the three treatises before us contain an immense amount of accurate observation and skilful reasoning. Speaking of the "De Generatione Animalium," Prof. Platt says with truth, "should any man of science come fresh to the reading of this treatise, he will, I think, be amazed and delighted to see what grasp and insight Aristotle displays in handling questions which still absorb us after all the time" that has since elapsed.

The question of the dates of the composition of these books is of considerable interest in its bearing on Aristotle's more strictly philosophical work. Prof. D'Arcy Thompson lays stress on the frequency of reference in the "History of Animals" and other Aristotelian writings to the island of Lesbos and places near it. From this and other evidence he inclines to the view that Aristotle's natural history studies were carried on, or mainly carried on, between his two periods of residence in Athens, for during this interval he is known to have lived for two years in Mitylene, before his summons to the Court of Philip to undertake the tutorship of Alexander. Mr. Warde Fowler, on the other hand, thinks it probable that the "History" was at any rate begun in early life, the foundations being no doubt laid during his boyhood at Stageirus.

"This little town," as Mr. Fowler points out, "is placed in a most favourable position for a naturalist. It lies on a sea abounding in fish; above it rise the wooded heights of the eastern coast of the Chalcidic peninsula on which it stands; only a few miles distant is the river Strymon, which was so famous for water- and marsh-loving birds, as to give its name as a perpetual epithet to at least one species ['Strymoniaë grues']. Straight across the sea from Egypt and the Soudan came, and still come, every spring, multitudinous armies of migrating birds; they rest awhile about these rivers of the Thracian coast,

and then pursue their way northwards, crossing the Balkan Mountains into the plains of the Danube and Russia, to return again in the autumn. And, of course, for an inquiring naturalist a seaport town is always a desirable place, for here come sailors from foreign lands with tales of strange birds and beasts and plants, specimens of which they sometimes bring home with them. . . . We may be sure that young Aristotle was quick to profit by these chances."

Whatever may have been the point in Aristotle's career at which the "History" was projected, there can be little doubt that he was always taking such opportunities as offered for making additions and corrections. It is also reasonable to suppose that the book as we have it may contain annotations by some of his pupils. The treatises "De Partibus" and "De Generatione" are shown by internal evidence to be later as a whole than the "History."

The present excellent translations will serve, it may be hoped, to induce many students of the history of biological knowledge to undertake an examination at first hand of the works of this great scientific pioneer. Aristotle suffers little by intelligent translation, for his excellence lies in the matter of his writings rather than in their form. "The author himself," as Prof. Platt justly observes, "would have been the last man in the world to complain of any sacrifice of graces of style." Though the translators have no doubt nearly always succeeded in "representing as exactly as possible what Aristotle said or meant to say," it must not be supposed that they have denied themselves the use of good and vigorous English. Dr. Ogle's translation of the "De Partibus" in especial (a revision of his former well-known version) is admirable as a piece of literary workmanship. The notes of all three translators are good and useful so far as they go; but to produce a completely annotated edition of Aristotle's biological works in the light of modern knowledge would be a task from which the boldest might shrink. The typography and general get-up of these volumes are all that could be desired, and are worthy of the reputation of the Clarendon Press. It should always be remembered with gratitude that their publication is due to the generous provisions of the will of the late Prof. Jowett.

F. A. D.

SOUTH AFRICAN ORCHIDS.

Icones Orchidearum Austro-Africanarum Extra-Tropicarum; or, Figures, with Descriptions of Extra-Tropical South African Orchids. By Dr. Harry Bolus. Vol. ii., pp. vi+200+100 plates. (London: Wm. Wesley and Son, 1911.) Price 2l. 2s. net.

TO Dr. Bolus's many botanical friends this volume, his last contribution to South African orchidology, has a special interest. Its production was the ostensible motive of his frequent journeys home during the past few years, and the revision for the press of its last few pages was completed on the eve of his death, which occurred shortly after his arrival in England early in the summer of the present year. The copies of his book, distributed by his niece and co-worker, Miss H. M. L. Kensit, are a fitting memento of the author and of the important influence he exerted on the progress of botanical exploration in South Africa.

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Bolus's botanical work was not confined to the study of the orchids. His wide and critical knowledge of the heaths is embodied in his contribution on that family in the "Flora Capensis"; and his extensive herbarium, which now passes to the South African College, bears witness to his general knowledge of the flora. But he will probably be best known for his careful study of the orchids, the results of which are embodied in various papers, but especially in the volume on the "Orchids of the Cape Peninsula" and the two volumes of the "Orchids of South Africa," the second of which is the subject of this notice.

The plan of the book is uniform with that of vol. i., which appeared in two parts (1893 and 1896 respectively). Excepting a few double plates and one on which are figured two species of *Mystacidium* discovered by, and dedicated to, Miss Alice Pegler, of Kentani, each of the hundred plates is devoted to one species; and the text consists of a corresponding number of quite separate technical descriptions. A characteristic feature is the duplication of each description in Latin and English. The distribution of each species is indicated by a citation of localities with collectors' names and numbers, and an indication is given of the source or sources from which the actual specimens figured were derived. The great majority of the plates were drawn from living specimens by Dr. Bolus himself, and the noting on the plate of the exact date at which the drawing was made shows that the material for the volume had been accumulating for more than twenty years. The extended period of preparation accounts for a slight want of uniformity of treatment. A few of the plates are in black and white; in the greater number, however, colour is used in proportions varying from the tinting of a simple leaf or flower to the full-blown coloured plate, such as that of *Disa uniflora* (plate 63). All are alike admirably clear, and include, in addition to the habit illustration, careful detailed drawings of the parts of the flower.

The species figured and described represent nineteen genera, but a large proportion are included in the typically South African genera, *Disa*, *Satyrium*, and *Eulophia*. Some are well-known species; a good proportion were discovered and have been previously described by Dr. Bolus, while a few, such as *Eulophia Pillansii* and *Mystacidium Aliciae*, are described here for the first time. Some are of special interest as representing rediscovered species. For instance, *Disa Telipogonis*, Reichenb. f., a remarkable little plant found by Berg on the summit of Table Mountain in 1816, was rediscovered in the same locality by Miss Kensit in 1904. The only other record of its occurrence was from the mountains in the Wellington district, where Dr. Schlechter found it in 1896, at a somewhat lower elevation.

A pleasing feature of Dr. Bolus's work is the readiness with which he gives credit wherever possible to those who have helped in his work either by sending specimens, or with their critical knowledge. Among these helpers may be mentioned, besides Miss Kensit, Dr. Schlechter, whose knowledge of the Cape orchids was perhaps second only to that possessed by Dr. Bolus, and Miss Alice Pegler, who has done good work